

REMARKS/ARGUMENTS

Claims 1-10 are pending in the application. Claims 5, 7, 9, and 10 have been withdrawn from consideration. Applicant withdraws claims 9 and 10 in light of the Examiner's contention that they do not correspond to the elected species.

Claims 1-4, 6, and 8 are rejected under 35 U.S.C. §102(b) as allegedly anticipated by U.S. Patent No. 5,006,975 to Neufeld (hereinafter Neufeld).

In order for a claim to be anticipated by a reference, the single prior art reference must describe, either expressly or inherently, each and every element as set forth in the claim. Applicant respectfully traverses the rejection, because Neufeld fails to set forth each and every claimed element in the manner set forth in the claims.

Claim 1 recites "[a]n alternating current signal level detection circuit." The circuit includes "a first comparator (52, 82) which receives a rectified voltage obtained by rectifying an alternating current signal generated by an alternating current power source, compares an instantaneous value of the rectified voltage with a first reference voltage (V2), and represents by a first comparison result periods in which the instantaneous value exceeds the first reference voltage." The circuit also includes "a second comparator (40, 70, 90) which compares the instantaneous value of the rectified voltage with a second reference voltage (V1) which is higher than the first reference voltage, and represents by a second comparison result periods in which the instantaneous value exceeds the second reference voltage." Neufeld fails to describe at least these claimed features in the manner set forth in the claim.

Neufeld describes a power factor correction circuit that includes two comparators 34 and 36, a flip-flop 42 and an output stage 44. One input of each of the comparators 34 and 36 receives, via an attenuator 56, a signal corresponding to a rectified voltage output by a rectifier 10.

The comparators 34 and 36 and the flip-flop 42 of Neufeld are used for rendering the peaks of the current flowing through the inductor 16 and approximate (follow, or trace) the pulsing waveform of a rectified voltage output by a rectifier 10. The current flowing to the

inductor 16 is converted into a voltage by a resistor 35 and output via the current sense differential amplifier 38.

The comparator 34 compares the output signal of the current sense differential amplifier 38 with a signal supplied by the attenuator 56 that corresponds to the rectified voltage, and detects that the current flowing to the inductor 16 exceeds the signal corresponding to the rectified voltage. The comparator 36 detects that the current flowing to the inductor 16 takes the lower limit value. The comparator 34 does not detect whether the signal corresponding to the rectified voltage is large or small. Compared with this, the second comparator of the present invention detects whether the rectified voltage is large or not as compared to the second reference voltage.

Neufeld does not describe a circuit corresponding to the first comparator of the claimed invention. The first comparator of the claimed invention receives the rectified voltage, compares the instantaneous value of the rectified voltage with the first reference voltage and outputs the period in which the instantaneous value exceeds the first reference voltage as the first comparison result. The first comparison result is output one time for each cycle of the rectified voltage.

Neufeld describes comparator 36 as a valley comparator. The peak comparator 34 and the valley comparator 36 combine to form a window comparator circuit. *See, Neufeld*, at Col. 4, ll. 1-3.

The peak comparator 34 and valley comparator 36 do not anticipate the claimed first and second comparators. In claim 1, the second comparator "compares the instantaneous value of the rectified voltage with a second reference voltage (V1) *which is higher than the first reference voltage.*" (*emphasis added*). Neufeld fails to describe a second reference voltage that is higher than a first reference voltage. Instead, the output of the current sense amplifier 38 is coupled to both the peak comparator 34 and valley comparator 36. Thus, Neufeld fails to describe different first and second reference voltages, where the second voltage is higher than the first reference voltage.

Further, the flip-flop 42 of Neufeld alternatively memorizes that the current flowing to the inductor 16 exceeds the signal corresponding to the rectified voltage, based on the

output signals of the comparators 34 and 36, and that the current flowing to the inductor 16 takes the lower limit value.

In contrast, the claimed storage unit “stores information representing whether or not the rectified voltage exceeds the second reference voltage in each period in which the instantaneous value exceeds the first reference voltage (V_2), based on the first comparison result and the second comparison result.” The storage unit of the claimed invention stores the information representing whether the rectified voltage exceeds the second reference voltage, for each period in which the instantaneous value of the rectified voltage exceeds the first reference voltage.

Neufeld describes the peak comparator 34 and the valley comparator 36 combine to form a window comparator circuit. The flip-flop 42 does not indicate whether the rectified voltage exceeds the second reference voltage in each period in which the instantaneous value exceeds the first reference voltage. In Neufeld, the output of the current sense amplifier 38 is supplied to opposite polarity input terminals of the peak comparator 34 and the valley comparator 36, thus the two comparators 34 and 36 are incapable of determining when the rectified voltage exceeds the second reference voltage in each period in which the instantaneous value exceeds the first reference voltage. In short, the content memorized in the flip-flop 42 of Neufeld is different from the content stored in the storage unit of the claimed invention.

Furthermore, claim 1 includes “a determination signal output unit (53b, 55, 83b, 85, 86) which represents by a high-low determination signal whether a level of the alternating current signal generated by said alternating current power source is high or low in each cycle of the rectified voltage, based on the information stored in said storage unit.” Neufeld fails to describe this claimed feature. The Examiner contends that the output stage 44 corresponds to the claimed determination output unit. However, Neufeld describes the output stage 44 as “a group of transistors which convert a weak voltage signal from the comparators into a more powerful signal capable enough to drive a power transistor.” *Neufeld*, at Col. 4, ll. 12-15. The output stage in Neufeld is incapable of generating “a high-low determination signal whether a level of the alternating current signal generated by said alternating current power source is high or low in each cycle of the rectified voltage.” The flip-flop 42 in Neufeld does not have information

relating to whether the “level of the alternating current signal generated by said alternating current power source is high or low in each cycle of the rectified voltage,” and thus the output stage 44 is incapable of generating such information from the flip-flop 42 output.

It is the object of Neufeld to correct power factor in a power factor correction circuit, and the circuit is used for rendering the peaks, which appears a plurality of times in one cycle of the rectified voltage, of the current flowing to the inductor, approximate the waveform of the rectified voltage output by the rectifier 10. Therefore, in the technique of Neufeld, *it is not possible to determine whether the level of the alternative current signal is high or low*, and to output the result of the determination for each cycle of the rectified voltage.

Neufeld does not includes a description that suggests a technical idea of determining, from which cycle the level of the alternative current signal that is generated by the alternative current power source is changed.

Applicant respectfully requests reconsideration and allowance of claim 1, because Neufeld fails to describe every element of the claim in the manner set forth in the claim.

Each of dependent claims 2-4, 6, and 8 may have individual bases for patentability beyond those discussed above in relation to the independent claim. It is not necessary to discuss the patentable distinctions of each dependent claim because of the allowability of the base claim from which they depend. However, Applicant provides some illustrative examples.

Claim 4 includes the feature that the “determination signal output unit (53b, 55) represents by the high-low determination signal whether the level of the alternating current signal is high or low by *referring to the information stored in said storage unit (53a, 54) when a level of the rectified voltage passes over the first reference voltage (V_2) from a higher side to a lower side.*” (*emphasis added*). Neufeld fails to describe this claimed feature, and the Examiner fails to identify any portion of Neufeld that is alleged to anticipate this claimed feature. Neufeld fails to relate any determination of a level of an alternating current signal, and fails to discuss any transition of a level of a rectified voltage from a high side to a lower side of a first reference voltage. Therefore, claim 4 is believed to be allowable independent of any reasons for

allowability of the base claim from which it depends. Applicant respectfully requests reconsideration and allowance of claim 4.

Claim 6 further includes the features “a reset signal output unit (53a) which generates and outputs a reset signal (P1) based on the first comparison result of said first comparator (52) when the instantaneous value of the rectified voltage passes over the first reference voltage (V2) from the lower side to the higher side.” Neufeld fails to describe this claimed feature.

The Examiner contends that the “set” terminal on element 42 is a reset terminal. However, it is clear that the “set” terminal on the flip-flop 42 is an input terminal. The Examiner fails to identify any portion of Neufeld that describes a reset signal output unit that outputs a reset signal “based on the first comparison result of said first comparator.” Therefore, Neufeld fails to describe at least this claimed element. Applicant respectfully requests reconsideration and allowance of claim 6.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 858-350-6100.

Respectfully submitted,



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